

Hybrid topology of substrate integrated waveguide (SIW) filter and microstrip patch antenna for wireless communication system

ABSTRACT

This paper presents an analysis based upon the resonant circuit approach to develop hybrid system for integrating a microwave filter and an antenna in a single device. This technique is used to reduce the overall volume of RF/ microwave front-end device especially in wireless communication systems. This study focuses on the hybrid of rectangular Substrate Integrated Waveguide (SIW) filter with rectangular microstrip patch antenna to produce filtering and radiating element in a single system. To prove the concept, the hybrid of microwave filter and antenna, the operating frequency of 2 GHz is demonstrated and validated through simulation and experimental. The experimental performance shows promising results which were in good agreement with the simulated results particularly in exhibiting return loss better than 10 dB in the passband region. This study is useful for any hybrid microwave system whereby it can reduce the complexity of the design, weight and cost as it is very important in base stations and multiplexer in any wireless communication systems.

Keyword: Resonant circuit; Hybrid of microwave filters and antenna; Substrate integrated waveguide; Microstrip patch antenna